Integrative Approaches to Gestational Diabetes

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Objectives

- Participants will:
  - understand the usefulness and efficacy of 3 botanicals/supplements used in Diabetes Mellitus and its appropriateness in Gestational Diabetes
  - be familiar with 2 integrative approaches to Gestational Diabetes

Gestational Diabetes

- Defined as a carbohydrate intolerance of variable severity with onset or first recognition during pregnancy

Prevalence-

- Diabetes - most common medical complication of pregnancy
- Incidence of diabetes complicating pregnancy has increased about 40 percent between 1989 and 2002 (Martin and colleagues, 2003).
- In 2002, ~ 131,000 pregnancies complicated by diabetes, representing 3.3 percent of all live births (Martin and colleagues, 2003).
- More than 90 percent were gestational diabetes

Consequences

- More than half of women with gestational diabetes will go on to develop overt diabetes in the ensuing 20 years
- Growing evidence for long range complications in their children that include obesity and diabetes (Feig and Palda, 2002)

Potential Fetal Complications

- Gestational Diabetes-Class A1
  - macrosomia
  - shoulder dystocia
  - brachial plexus injury
  - Neonatal hypoglycemia
  - fetal anomalies are NOT increased (Sheffield and colleagues, 2002)
- Overt Diabetes and Class A2 and above
  - spontaneous abortion
  - preterm delivery
  - stillbirth
  - congenital malformations
  - neonatal morbidity
  - complications as in gestational diabetes

Potential Maternal Complications

- Gestational
  - C-section
  - increased risk of CV complications
  - elevated lipids
  - HTN
  - metabolic syndrome
- Overt
  - 10 fold increase risk of maternal death (Cousins, 1987).
  - ketoacidosis
  - preeclampsia
  - retinopathy
  - neuropathy
  - infections

Goals of therapy

- Fasting plasma glucose <95 mg/dL
- 2 hour postprandial blood glucose < 120mg/dL

Mary's Story

Mary

- 26 y/o Hispanic G1P0
- 25 weeks gestation
- 1 hour glucose tolerance test 160 mg/dL
- 3 hour glucose tolerance test also abnormal
- Family Hx – Mom with diabetes mellitus on insulin w/ h/o gestational diabetes when pregnant with Mary
- Eats a diet high in sat fat and carbohydrates

Current Care Strategies

- Diet –
- Exercise –
- Insulin- started when FBG persists >105 mg/dL
- Oral hypoglycemics – not currently recommended by ACOG

Diet

- Nutrition counseling
- 30 kcal/kg/d based on pre-pregnant weight
- if obese – caloric restriction

- Fresh fruits and vegetables
- Low glycemic index carbohydrates
- Whole grains
- High fiber - oats
- Low saturated fat
- Low fat dairy
- Avoid refined sugar

Diet -

- Oats –
  - Pilot crossover study 8 Type II diabetic males
  - High fiber oat bran concentrate bread product x 12 weeks (34 gm/d fiber)
  - vs. diet with 19 gm/d fiber
  - after 24 weeks lower postprandial glucose and insulin levels
  - lower total and LDL cholesterol and TGA
  - (Pick, et al. 1996)

Diet -

- Fiber –
  - Small randomized crossover study of 13 Type II diabetic patients
  - 6 weeks high fiber – 50 gm/d (25 gm soluble + 25 gm insoluble
  - vs. 6 weeks moderate fiber – 24 gm/d (8 gm soluble + 16 gm insoluble
  - Results – decreased preprandial glucose levels by 13 mg/dL, decreased TC, VLDL, TGA (Chandalia, et al. 2000)

Diet –

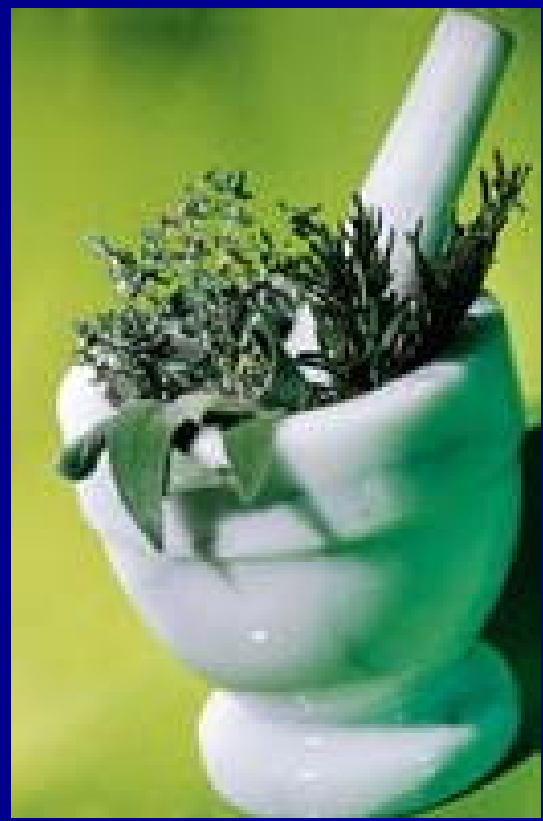
- Cinnamon –
  - 2003 study – 60 Type II diabetics
  - Dose -1,3 or 6 gm/day cassia cinnamon x 40 days
  - Results – decreased FBG (18-29%), TGA (23-30%), TC (7-27%) LDL (12-26%) (Khan, et al. 2003)
  - 1 tsp. cinnamon = 4.75 grams

Exercise

- Physical activity during pregnancy reduces the risk of gestational diabetes (Dempsey and colleagues 2004)
- Resistance exercise helped avoid insulin therapy in overweight women with gestational diabetes (Brankston and associates 2004)

Potential Herbal Therapy in Diabetes Mellitus

- Gymnema
- Bitter melon
- Prickly Pear
- Fenugreek



Gymnema sylvestre

- Herb used in Ayurveda – a traditional East Indian healing system
- Two non-randomized controlled clinical trials by same research group of Type I and Type II diabetics (Baskaran, et al. 1990. Shanmugasundaram,et al. 1990)
- Showed decreased fasting blood glucose, HgA1C and medication requirements
- Dose – 400 mg GS4 water-soluble leaf extract
- Insufficient data for use in pregnancy

Bitter melon- *Momordica charantia*

- Vegetable eaten regularly in India, Asia, South America and Africa
- Small, preliminary study in Type I and II diabetics using injectable juice extracts showed acute reduction in BG at 30 min, 4 hr and 12 hr. (Baldwa et al. 1977)
- A case series looking at GTT after 50ml bitter melon fruit juice, and then after 8-11 weeks of fried melon bits
- Results - 12% drop in GTT after juice, 6% after melon bits, 8% drop in HgA1c after bits (Leatherdale et al. 1981)

Bitter melon-

- Type I and II diabetics have shown improved glucose tolerance and reduction in mean blood glucose levels (Yeh, et al. 2003)
- Studies of poor quality and small size
- No studies in pregnancy

Bitter Melon - Safety

- Animal study showed a glycoprotein found in seeds to inhibit pregnancy in rats (Chan WY, Tam PP, Yeung HW. 1984.)
- Aqueous *root* extract abortifacient effects in mice (Aguwa CN, Mittal GC. 1983)
- Likely safe when eaten as a food
- Avoid extracts in pregnancy

Prickly Pear – "Nopales" - *Opuntia streptacantha*

- Commonly used by Mexican people for glucose control
- Two small studies in Type II diabetes (Frati, et al. 1988; 1990)
- Single dose - 500 gm grilled or broiled stems
- Decreased fasting glucose and insulin levels
- No side effects reported
- Likely safe in pregnancy as a food

Nopales -

- May reduce blood sugar due to high fiber content
- 1 cup chopped pads = 60 calories = 5 grams fiber (20% of daily dose)
- Can be either grilled or added to vegetable dishes
- Available at many groceries

Fenugreek – *Trigonella foenum graecum*

- Legume cultivated in India, N. Africa and the Mediterranean
- Small study of Type I and II diabetics using defatted fenugreek seed powder, 100 gm/day in unleavened bread for 10 days (Sharma, et al. 1990)
- Results – decreased fasting blood sugar, postprandial glucose, and urine glucose
- Side effects - none

Fenugreek

- A study of 60 poorly controlled Type II diabetics
- Dose - 25 grams of fenugreek seed powder divided into two doses at lunch and dinner
- After 24 weeks - 47% achieved full glycemic control, 33% moderate control, 20% minimal control
- Significant improvement in fasting blood glucose and improved glucose tolerance (Sharma, et al. 1996)

Fenugreek - Safety

- Both water and alcoholic extracts exert a stimulating effect on isolated guinea pig uterus, especially during late pregnancy (Abdo MS, al Kafawi AA. 1969).
- May possess abortifacient effects, therefore, NOT recommended for use in doses higher than found in foods during pregnancy (Farnsworth et al. 1975).
- May be safe as a food
- Would NOT recommend an extract

Bottom Line for Herbs

- In pregnancy –
  - Avoid extracts
  - Food sources likely safe

Supplements in diabetes mellitus

- Chromium
- Vanadium
- Fish oil

Chromium picolinate

- Functions by regulating or potentiating insulin action
- Response time 10 days - > 3 months
- Impaired glucose tolerance appears related to chromium deficiency
- In China, 833 Type II diabetics taking 500mcg/d were followed 10 months
- Results - decreased fasting and postprandial glucose (Cheng, Zhu, Shi, 1999)
- Other studies with mixed results

Chromium picolinate

- Apparently one study in gestational diabetes
- Patients responded better to 8 mcg/kg of chromium picolinate than 4 mcg/kg (Jovanovic-Peterson, et al, 1996)
- No other studies in pregnancy
- Adequate Intake (AI) for pregnant women age 19-50 is only 30 mcg/day, above dose would be 500-600 mcg/d

Chromium picolinate - safety

- Some biochemical concern that reduction products may promote hydroxyl radicals and potential DNA damage
- However, animal studies show no carcinogenic or mutagenic effects in vivo
- Would **NOT** recommend to pregnant patients.

Vanadium

- 3 non-randomized, single-blind crossover studies (Cohen, et al.1995; Halberstam, et al. 1996; Boden, et al. 1996.)
- Total of 21 Type II diabetics
- 100 mg/d vanadyl sulfate hydrate for 3-4 weeks
- Results – decreased FBG, HgA1C, hepatic glucose production/output
- Side Effects- high rate of GI discomfort 18/21
- Insufficient evidence for safety in pregnancy for amounts > upper intake level of 1.8 mg

Fish Oil

- Cochrane Review showed no statistically significant effect on glycemic control (Farmer, et al. 2001)
- May have benefit on fetal/infant neural and retinal development when taken during last trimester of pregnancy (van Houwelingen, et al. 1995)
- May reduce risk of post partum depression
- May also be beneficial post-partum for breast-fed infants

Fish Oil

- Dose 1000 mg DHA/day
- Want a product free of methyl mercury
- Consumerlabs.com for good quality product
- Avoid fish with potentially high mercury level such as mackerel, swordfish, shark and tilefish

Yoga in Pregnancy

- Study of 166 pregnant patients - trained in yoga, relaxation, meditation and breathing exercises
- Practiced 1 hour per day
- 164 controls received routine prenatal care
- Results indicated reduced rates of prematurity, maternal HTN, and improved birth weight in intervention group (Narendran, et al. 2005)

Yoga in DM II

- Study of 24 Type II diabetics (Singh, et al. 2004)
- Sequence of 13 asanas performed 30-40 min/day for 40 days under guidance.
- Significant decrease in fasting blood glucose levels of 50 mg/dL after yoga regimen.
- The postprandial blood glucose levels decreased 75 mg/dL
- Glycosylated hemoglobin showed a decrease from 1.2 %
- Blood pressure and pulse rate improvements also noted

Mind-Body Approaches

- Relaxation techniques such as:
  - progressive muscle relaxation
  - guided imagery
  - deep breathing exercises
- May provide some benefit with regard to lowering HgA1C (Surwit, et al. 2003))
- Will benefit the fetus by reducing maternal stress hormones (Bijlani, et al. 2005)

Postpartum

- “Lifestyle behavioral changes, including weight control and exercise between pregnancies, likely would prevent recurrence of gestational diabetes as well as modify onset and severity of type 2 diabetes later in life” (Pan and associates, 1997).

Back to Mary

- Nutrition counseling and dietary changes
- May add prickly pear, beans, steel cut oats to diet for fiber, also add cinnamon
- Fish oil – DHA 1000mg/day for Mom and baby
- Exercise - Yoga
- Meditation – Relaxation techniques
- Lifestyle changes postpartum

Thank you !

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